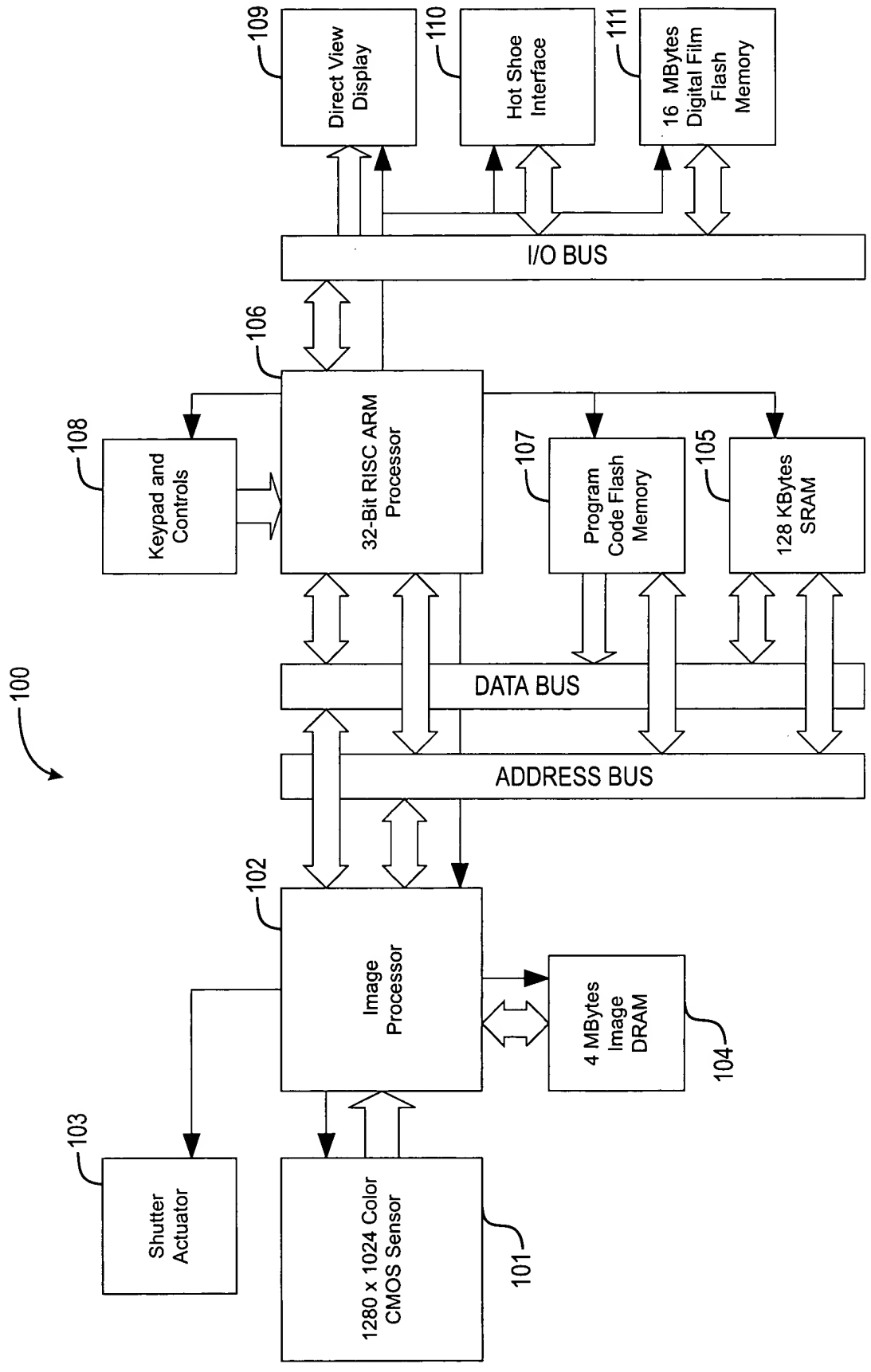

100
101
102
103
104
105
106
107
108
109
110
111
Direct View Display
Hot Shoe Interface
16 MBytes Digital Film Flash Memory
I/O BUS
32-Bit RISC ARM Processor
Keypad and Controls
Program Code Flash Memory
128 KBytes SRAM
DATA BUS
ADDRESS BUS
Image Processor
4 MBytes Image DRAM
Shutter Actuator
1280 x 1024 Color CMOS Sensor

FIG. 1A

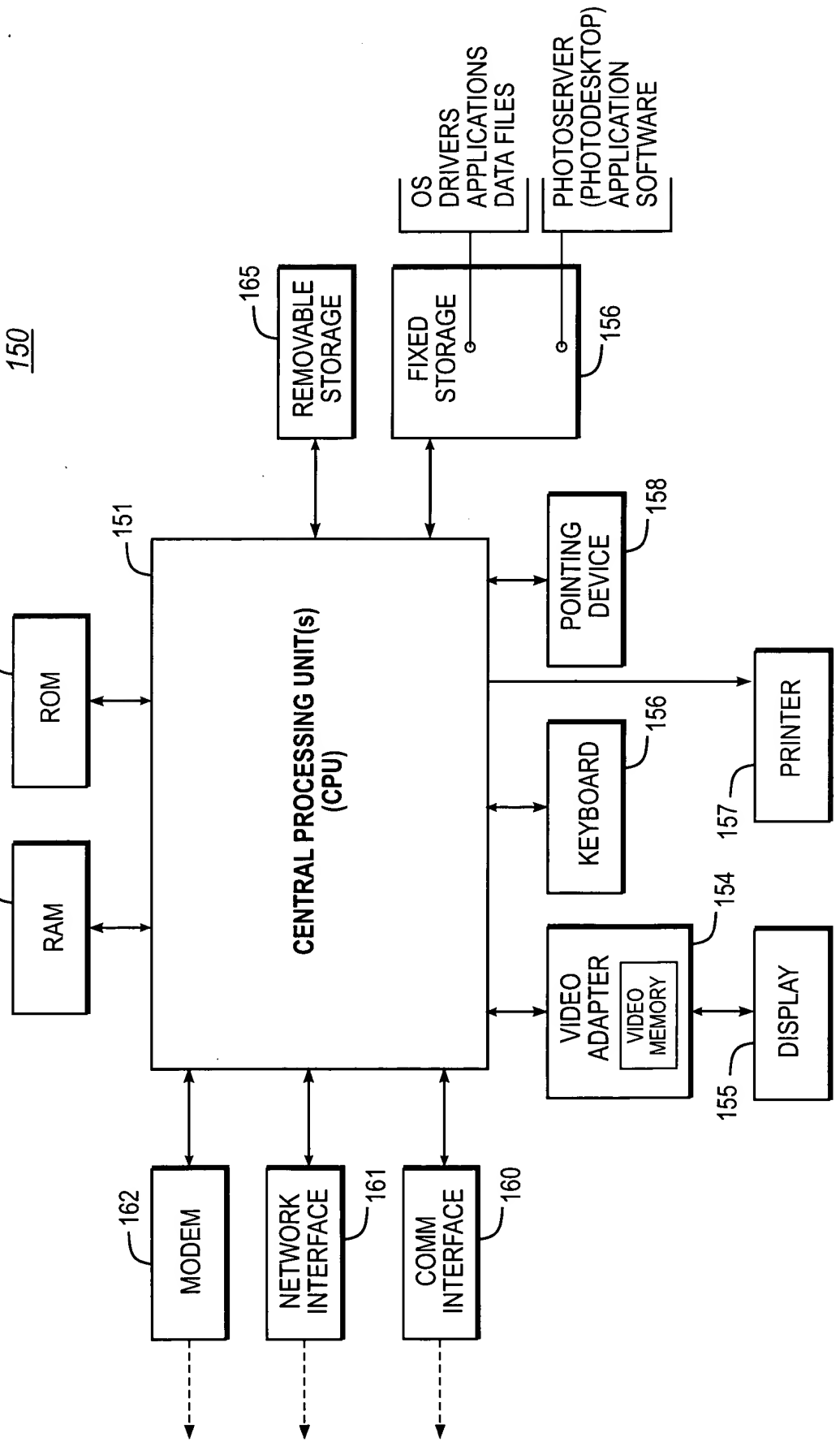

150
CENTRAL PROCESSING UNIT(s) (CPU)
151
ROM
153
RAM
152
MODEM
162
NETWORK INTERFACE
161
COMM INTERFACE
160
REMOVABLE STORAGE
165
FIXED STORAGE
156
OS DRIVERS APPLICATIONS DATA FILES
PHOTOSERVER (PHOTODESKTOP) APPLICATION SOFTWARE
POINTING DEVICE
158
KEYBOARD
156
PRINTER
157
VIDEO ADAPTER
VIDEO MEMORY
154
DISPLAY
155

FIG. 1B

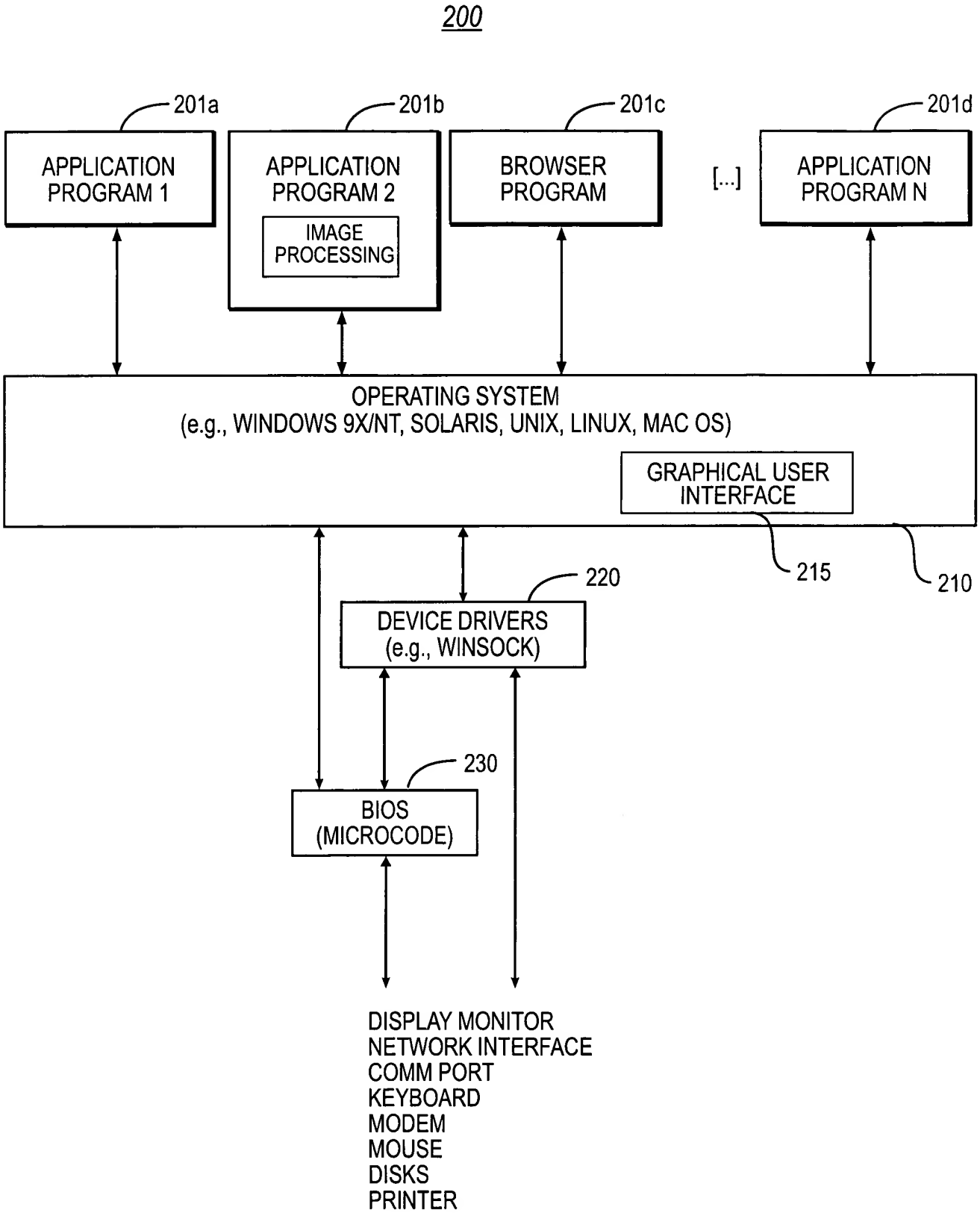

200
201a
APPLICATION PROGRAM 1
201b
APPLICATION PROGRAM 2
IMAGE PROCESSING
201c
BROWSER PROGRAM
[...]
201d
APPLICATION PROGRAM N
OPERATING SYSTEM
(e.g., WINDOWS 9X/NT, SOLARIS, UNIX, LINUX, MAC OS)
GRAPHICAL USER INTERFACE
215
210
220
DEVICE DRIVERS
(e.g., WINSOCK)
230
BIOS
(MICROCODE)
DISPLAY MONITOR
NETWORK INTERFACE
COMM PORT
KEYBOARD
MODEM
MOUSE
DISKS
PRINTER

FIG. 2

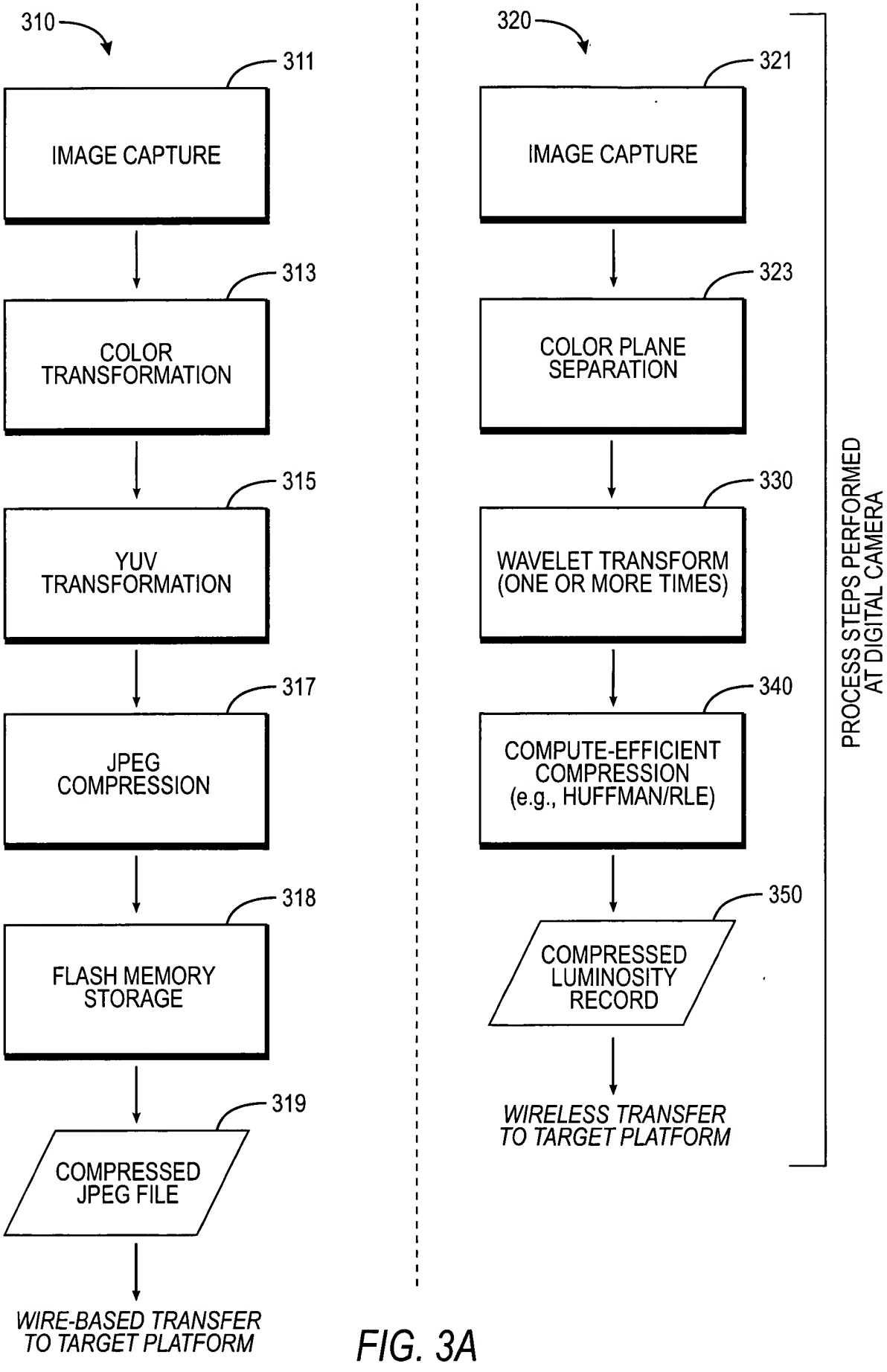

310
311
IMAGE CAPTURE
313
COLOR TRANSFORMATION
315
YUV TRANSFORMATION
317
JPEG COMPRESSION
318
FLASH MEMORY STORAGE
319
COMPRESSED JPEG FILE
WIRE-BASED TRANSFER TO TARGET PLATFORM
320
321
IMAGE CAPTURE
323
COLOR PLANE SEPARATION
330
WAVELET TRANSFORM (ONE OR MORE TIMES)
340
COMPUTE-EFFICIENT COMPRESSION (e.g., HUFFMAN/RLE)
350
COMPRESSED LUMINOSITY RECORD
WIRELESS TRANSFER TO TARGET PLATFORM
PROCESS STEPS PERFORMED AT DIGITAL CAMERA

FIG. 3A

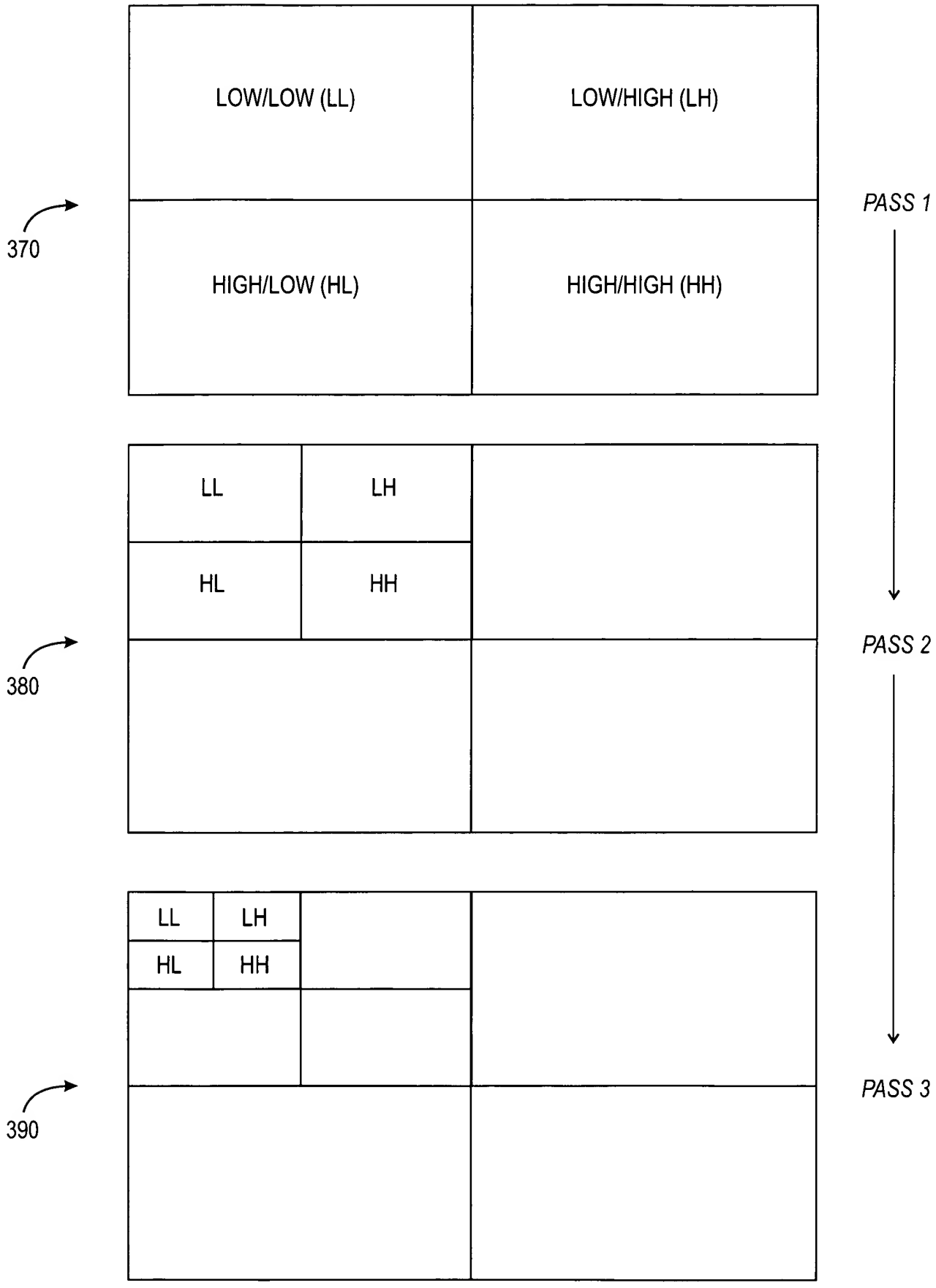

LOW/LOW (LL)
LOW/HIGH (LH)
HIGH/LOW (HL)
HIGH/HIGH (HH)
370
PASS 1
LL
LH
HL
HH
380
PASS 2
LL
LH
HL
HH
390
PASS 3

FIG. 3B

FIG. 3C

JPEG COMPRESSION (48:1)

FIG. 3D

WAVELET TRANSFORM COMPRESSION (48:1)

FIG. 3E

JPEG COMPRESSION (32:1)

FIG. 3F

WAVELET TRANSFORM COMPRESSION (32:1)

FIG. 3G

JPEG COMPRESSION (16:1)

FIG. 3H

WAVELET TRANSFORM COMPRESSION (16:1)

FIG. 3I

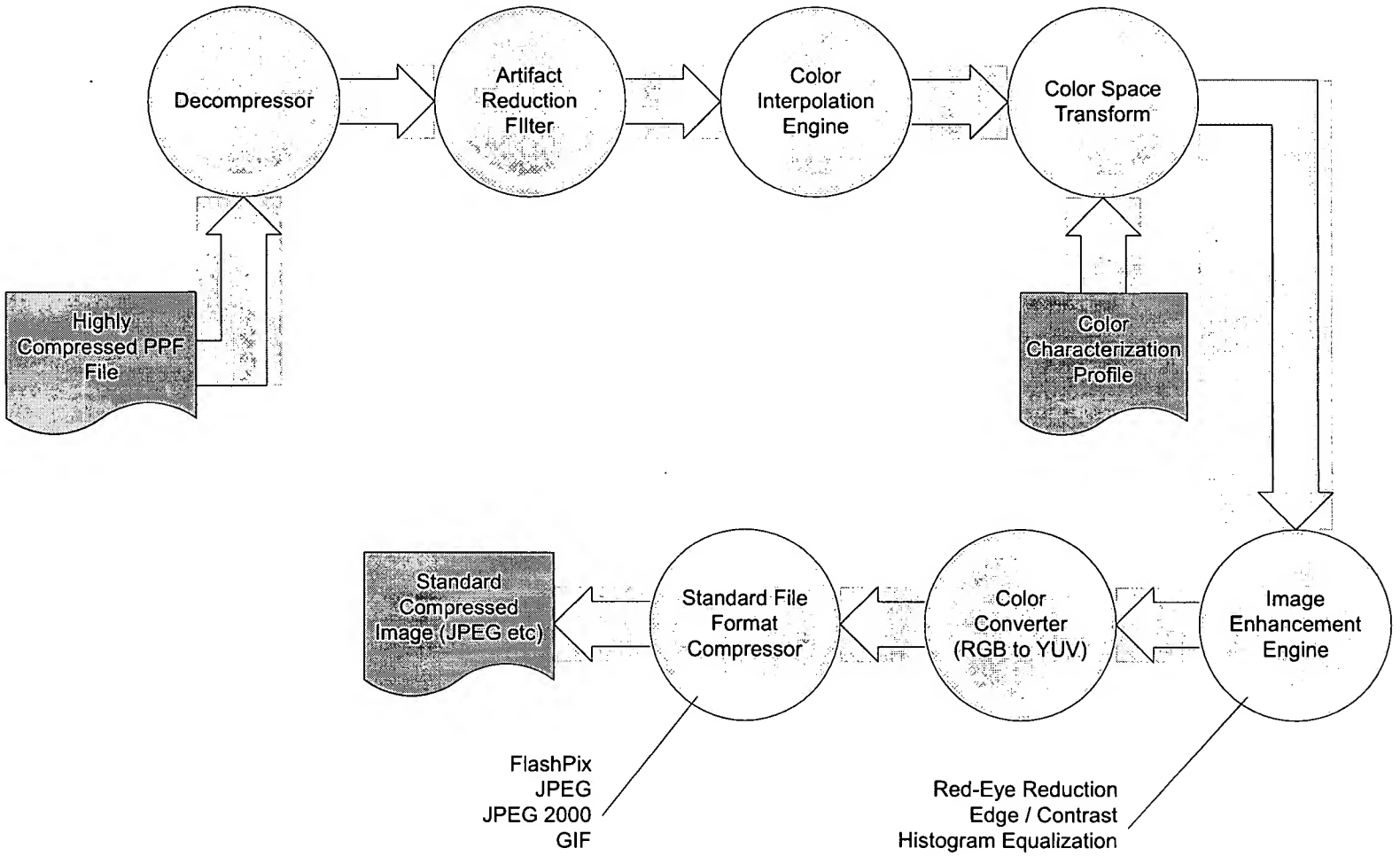


FIG. 4A

LIGHTSURF TECHNOLOGIES, INC.
LS/0001.01
SHEET 10 OF 17

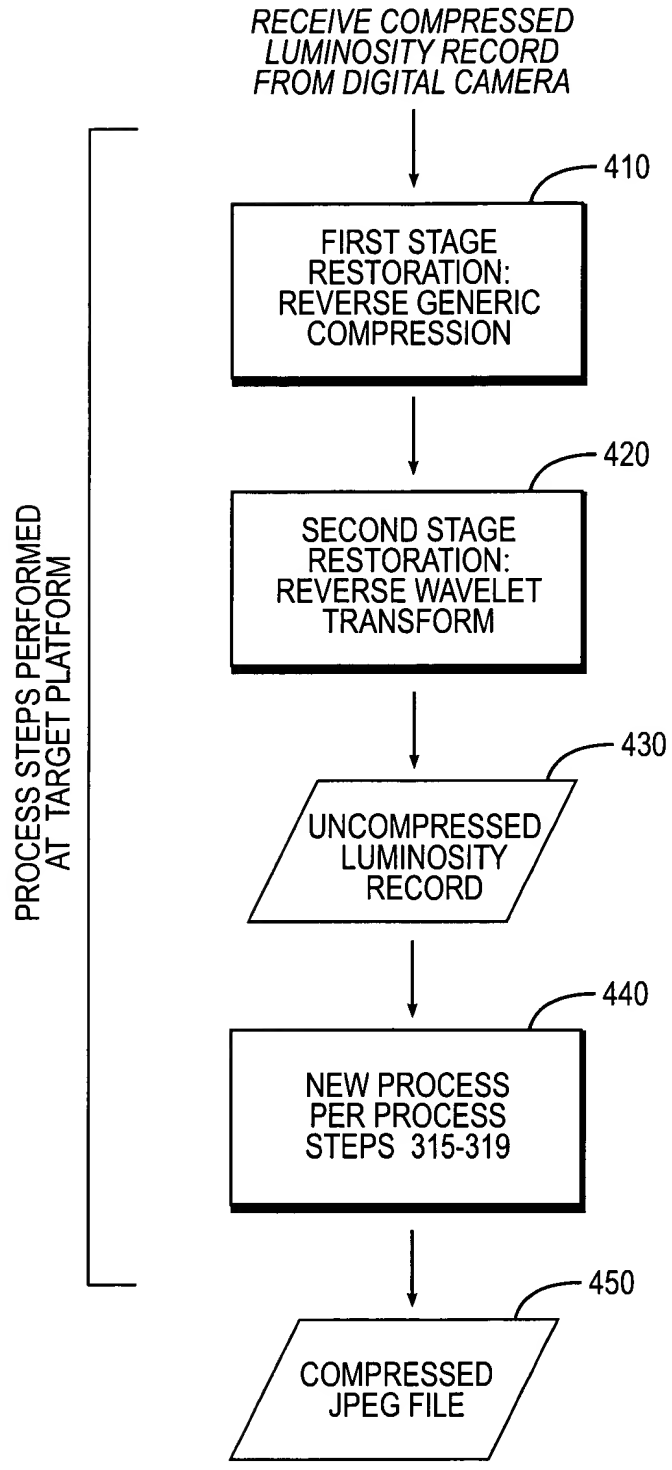

RECEIVE COMPRESSED LUMINOSITY RECORD FROM DIGITAL CAMERA
PROCESS STEPS PERFORMED AT TARGET PLATFORM
410
FIRST STAGE RESTORATION: REVERSE GENERIC COMPRESSION
420
SECOND STAGE RESTORATION: REVERSE WAVELET TRANSFORM
430
UNCOMPRESSED LUMINOSITY RECORD
440
NEW PROCESS PER PROCESS STEPS 315-319
450
COMPRESSED JPEG FILE

FIG. 4B

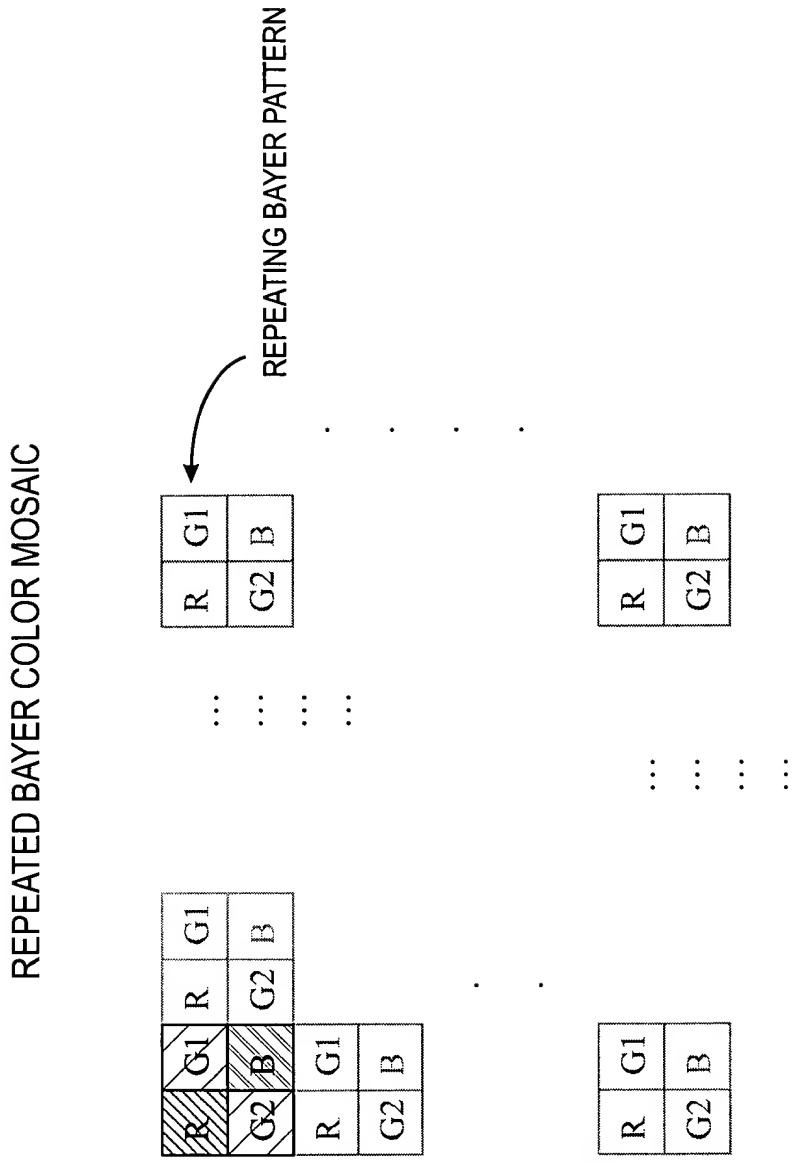

REPEATED BAYER COLOR MOSAIC
REPEATING BAYER PATTERN
R
G1
G2
B

FIG. 5

DOCKET TESSERA

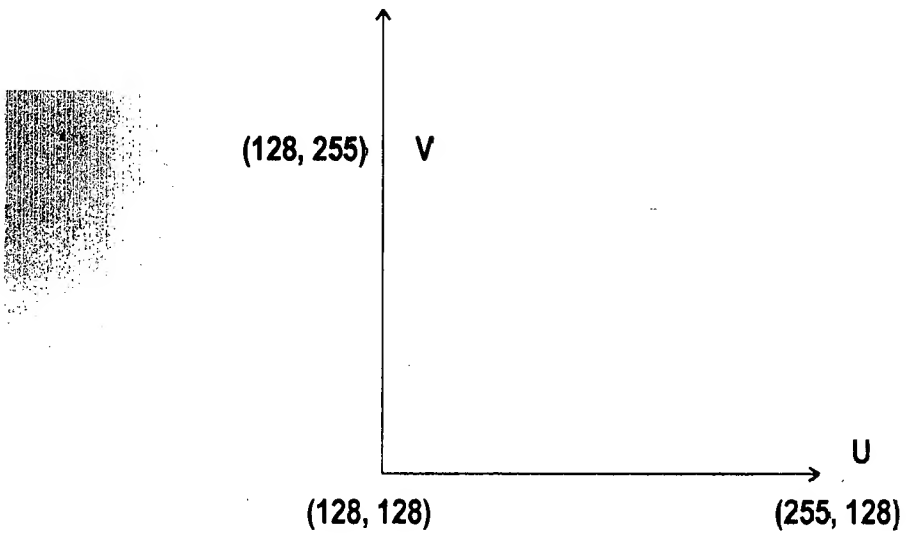


FIG. 6A

LIGHTSURF TECHNOLOGIES, INC.
LS/0002.00
SHEET 18 OF 17

ONE CELL OF THE BAYER PATTERN (HATCHED)
AND SOME SURROUNDING PIXELS.

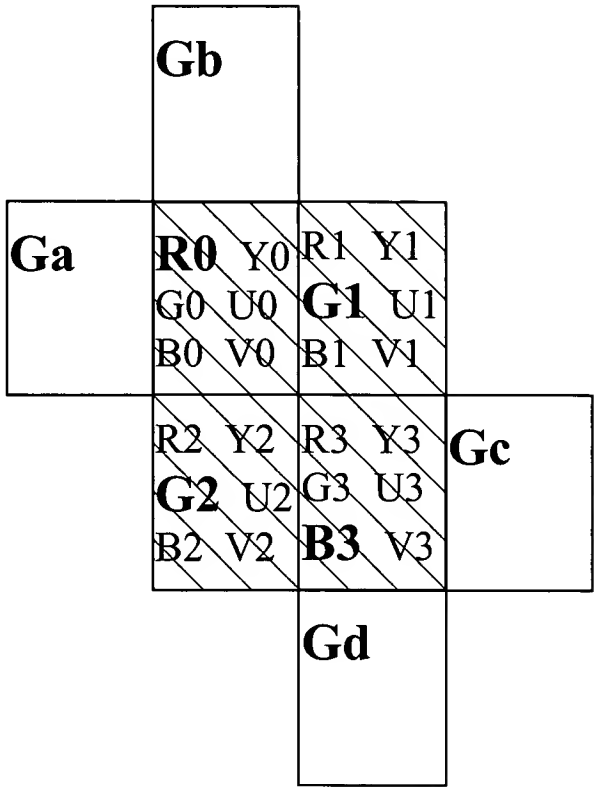


FIG. 6B

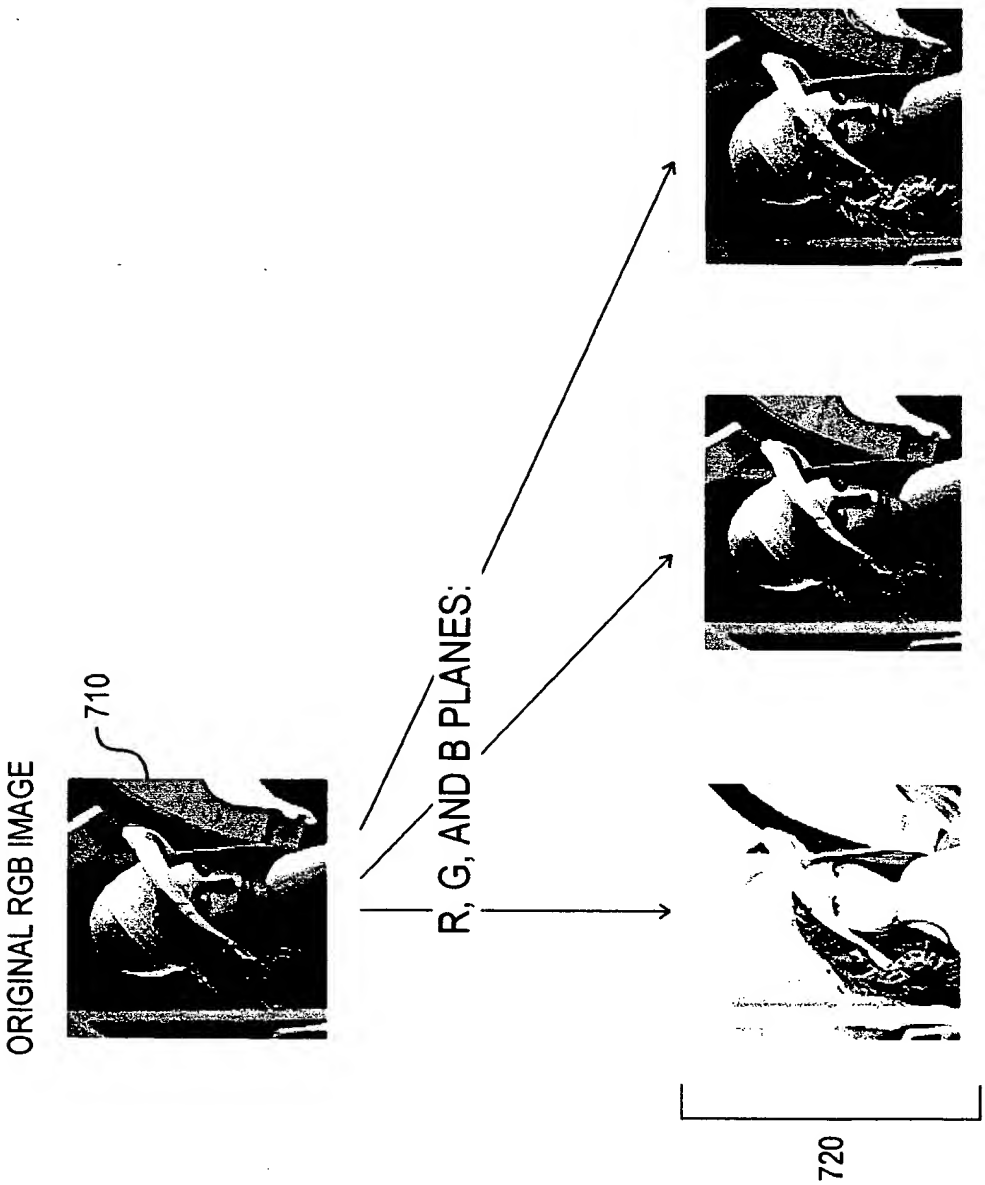


FIG. 7A

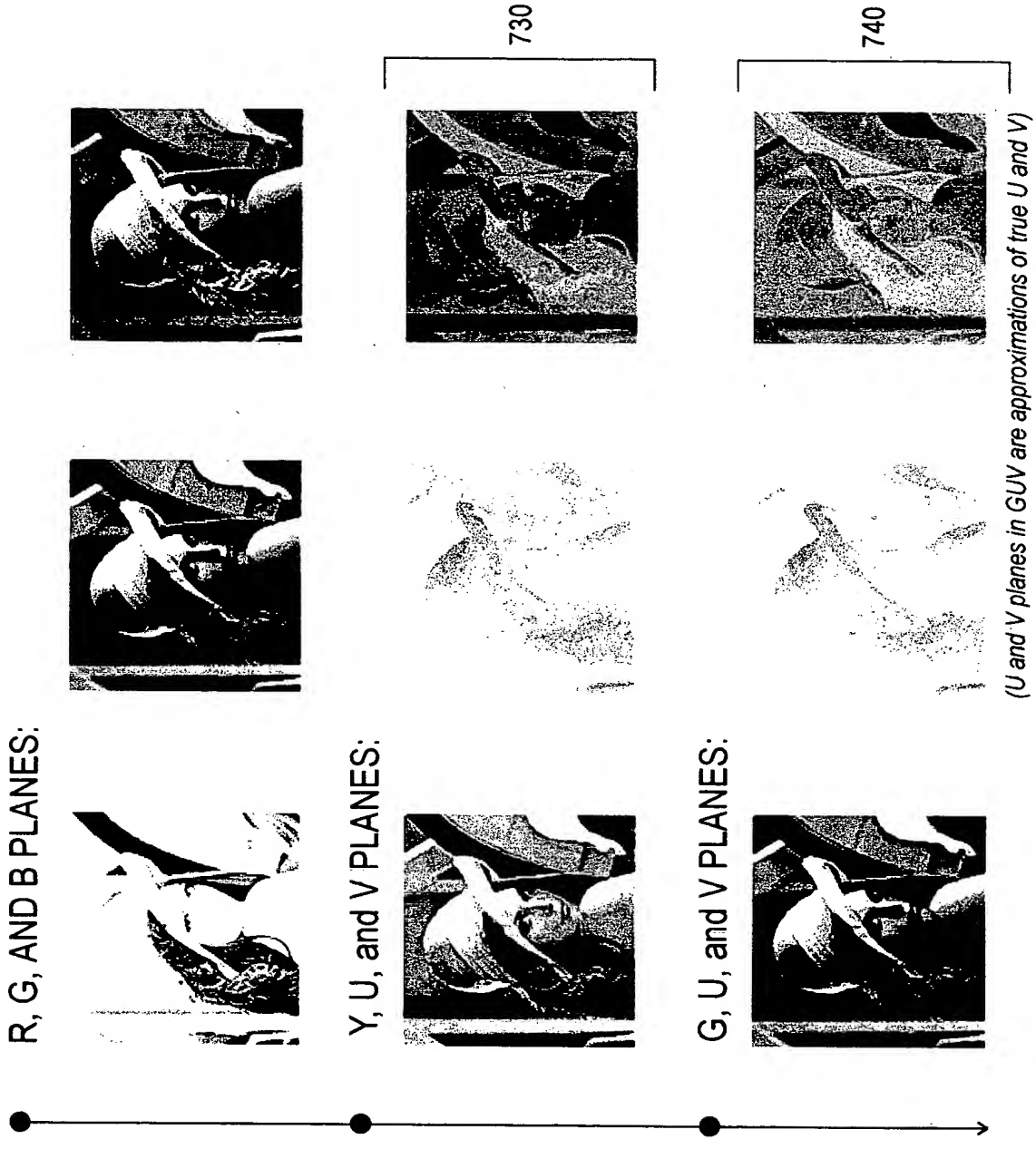
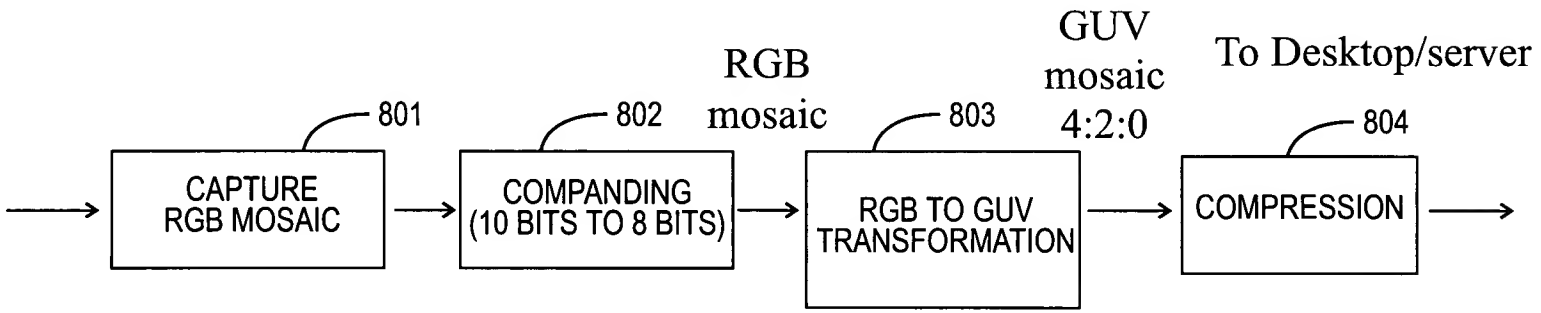
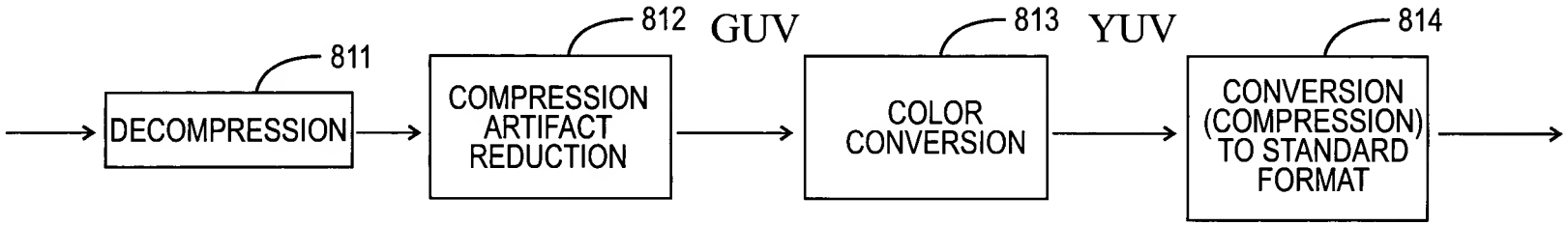

R, G, AND B PLANES:
Y, U, and V PLANES:
G, U, and V PLANES:
730
740
(U and V planes in GUV are approximations of true U and V)

FIG. 7B

DOCKET TESCAM.CO



(a) Imaging Device



(b) Server/desktop

FIG. 8

LIGHTSURF TECHNOLOGIES, INC.
LS/0002.00
SHEET 12 OF 17